

female, and they were soon connected, and the claspers were inserted to the base.

The claspers of the snakes are covered with a number of slender spines on all sides, and they may often be seen protruding at the sides of the vents in specimens in spirits; and specimens with them so protruding are figured by Seba and other iconographers. Mr. Ford informed me that in the puff-adder the claspers are dark brilliant reddish purple, covered with abundant white recurved spines.

XXXVII.—*Sketch of a Natural Arrangement of the Order Docoglossa.* By W. H. DALL\*.

THE following is a preliminary sketch of a more natural arrangement of the Mollusca contained in the orders CERVICOBRANCHIATA and CYCLOBRANCHIATA of Gray, taken from the results of investigations now in preparation for publication in a more extended form. These investigations having shown that no line can be drawn between the two orders of Gray above mentioned, it follows that they must be consolidated; and for the group in question the order DOCOGLOSSA, Troschel (minus the *Polyplacophora* and *Solenocoencha*), has been restricted and adopted. As the denominations previously applied all imply an erroneous idea of the structure of the animals, this course has been determined upon in preference to using prior, but incorrect, ordinal names.

The order, as here restricted, was first recognized by me in "A Revision of the Mollusca of Massachusetts" (Proc. Boston Soc. Nat. Hist. xiii, p. 245, March 1870), at which time only the characters of the suborder *Abranchiata* had been fully worked out. Since that time I have investigated the characters of the suborder *Proteobranchiata*, as here restricted; and in a paper read before the American Association for the Advancement of Science, at Troy, September 1870, of which a synopsis was published in the 'American Naturalist' (November 1870, p. 561), I restricted the order DOCOGLOSSA within its present limits, from the researches above mentioned. Among the fruits of these investigations was the definite exclusion of the *Gadiniidae* from the order (see Am. Journ. Conch. 1870, vi. p. 8). It is proper to state that Prof. Theodore Gill had, upon general considerations, adopted the same limits for the order in his unpublished manuscript, although the conclusions to which I have been led were the result of independent ana-

\* From the 'Proceedings of the Boston Society of Natural History,' Feb. 7, 1871. Communicated in advance by the Author.

tomical investigations upon my part, which, so far as I am aware, are the only ones, including the whole order, which have been made. I am indebted to Prof. Gill for suggesting the very appropriate names by which I have designated the suborders as restricted.

Class *GASTEROPODA*.

Order *DOCOGLOSSA*, Dall ex Troseh. 1870.

Suborder **ABRANCHIATA** (Gill), Dall, 1870.

Radula furnished with a rhachidian tooth and two uncini. Animal destitute of eyes, branchiæ, and lateral teeth on the area.

Family **Lepetidæ** (Gray), Dall, 1869.

Shell patelliform; apex erect or anteriorly directed. Muzzle of the animal with an entire edge; furnished with a tentacular appendage below on each side.

Formula of the radula,  $\frac{1}{2(0.0)2}$ .

Genus *LEPETA*, Dall ex Gray, 1869.

A. *Lepeta*, Dall.

Rhachidian tooth tricuspid, coneave in front; central cusp simple, much the largest; lateral cusps small, emarginate, base very broad; uncini with simple cusps.

Type *Lepeta caeca* (Gray), Dall, Am. Journ. Conch. 1869, v. p. 141.

B. *Cryptobranchia*, Dall ex Midd. 1869.

Rhachidian tooth with three short cusps, equal and parallel before and behind, not pointed; base moderately broad, more or less ornate behind; uncini with simple cusps.

Type *Cryptobranchia concentrica* (Midd.), Dall, Am. Journ. Conch. 1869, v. p. 143.

C. *Pilidium*, Dall ex Forbes, 1869.

Rhachidian tooth tricuspid, central cusp much the largest, convex in front; lateral cusps simply pointed; base narrow; uncini with cusps obliquely twisted.

Type *Pilidium fulvum* (Forbes), Dall, Am. Journ. Conch. 1869, v. p. 146.

Suborder **PROTEOBRANCHIATA**, Dall, 1870.

Animal provided with three lateral teeth, with eyes, and with external branchiæ. Rhachidian tooth usually wanting. Uncini present or absent.

Family *Acmæidæ*, Carpenter.

Shell patelliform. Animal provided with a free cervical branchia issuing from the left side of the body, above the head; muzzle surrounded with a frill of integument. Radula without a rhachidian tooth, and with three lateral teeth on each side; with or without accessory uncini.

A. Destitute of a branchial cordon. *Acmæa*.

1. *Acmæa*, Eschscholtz, 1828. (Syn. *Tecture*, Cuvier, 1830; *Tectura*, Gray, 1847.)

Teeth subequal, parallel in both axes; uncini absent; muzzle-frill produced into two lappets.

$$\text{Formula, } \frac{0}{0(1-1-1.1-1-1)0}.$$

Type *A. mitra*, Esch. Zool. Atlas, 1833, v. p. 18. no. 1; Philippi, Zeit. f. Mal. 1846, p. 106.

2. *Collisella*, Dall, n. subgen.

a. Third lateral smaller than, and opposed to, the second; first laterals anterior; muzzle-frill without lappets; a single minute uncinus on the pleura.

$$\text{Formula, } \frac{0}{1(2-1.1-2)1}.$$

Type *Acmæa pelta*, Esch. l. c. 1833, no. 5.

b. Provided with two minute uncini on the pleura. (? *Collisellina*).

$$\text{Formula, } \frac{0}{2(2-1.1-2)2}.$$

Type *Patella saccharina*, Linn., Gmel. S. N. 1792, p. 3695. no. 19.

B. Cordon present, interrupted in front. *Lottia*.

1. *Lottia* (Gray), Cpr. 1863. Without muzzle-lappets; teeth as in *Collisella* (a).

$$\text{Formula, } \frac{0}{1(2-1.1-2)1}.$$

Type *L. gigantea* (Gray), Cpr. Am. Journ. Conch. 1866, ii. p. 342.

c. Cordon present, complete, uninterrupted. *Scurria*.

1. *Scurria*, Gray, 1847. No muzzle-lappets; teet has in the last.

$$\text{Formula, } \frac{0}{1(2-1.1-2)1}.$$

Types: *S. scurra* (Lesson), Gray, P. Z. S. 1847, p. 158; *S. mesoleuca* (Mke.), Cpr. Maz. Cat. 1857, p. 208. no. 263 (as *Acmæa*).

Family *Patellidæ*, H. & A. Adams.

Animal without a cervical gill or muzzle-frill. Rhachidian tooth rarely present; uncini three in number. A more or less complete cordon of branchiæ between the mantle-edge and foot.

## A. Branchial cordon complete.

a. Provided with a rhachidian tooth. *Ancistromesus*.

1. *Ancistromesus*, Dall, n. g. Two inner laterals on each side, anterior to the third, which is larger and denticulate; branchial lamellæ produced, arborescent; sides of foot smooth.

$$\text{Formula, } \frac{1}{3(1-2 \cdot 2-1)3}.$$

Type *Ancistromesus mexicanus*, Dall ex Brod. & Sby. (as *Patella*) Zool. Journ. iv. p. 369; Rve. Conch. Icon. 1855, *Patella*, pl. 1. no. 1.

b. Without a rhachidian tooth. *Patella*.

1. *Patella*, Linn. 1757. Lateral teeth and foot essentially as in the last; branchial lamellæ linguiform, short, subequal all around.

$$\text{Formula, } \frac{0}{3(1-2 \cdot 2-1)3}.$$

Type *Patella vulgata*, Linn. Syst. Nat. ed. 12. 1767, p. 1258. no. 758.

2. *Patinella*, Dall, n. subg. First inner lateral on each side anterior to the other two; second laterals largest, denticulate; foot with a scalloped frill, interrupted only in front; branchiæ as in *Patella*.

$$\text{Formula, } \frac{0}{3(2-1 \cdot 1-2)3}.$$

Type *Patinella magellanica*, Gmel. (as *Patella*) Syst. Nat. 1792, i. p. 3703. no. 52.

3. *Nacella*, Schum. 1817. Shell thin, pellucid, apex anterior; foot frilled, as in *Patinella*; teeth bidentate, arranged as in the last; branchial lamellæ very small in front, but not interrupted.

$$\text{Formula, } \frac{0}{3(\frac{2}{2}-\frac{1}{2} \cdot \frac{1}{2}-\frac{2}{2})3}.$$

Type *Nacella mytilina*, Gmel. Syst. Nat. 1792, vol. i. p. 3698. no. 28 (as *Patella*) = *Nacella mytiloides*, Schum. 1817, and *Patella cymbularia*, Lam. 1819.

B. Branchial cordon interrupted in front. *Helcion*.

1. *Helcion*, Montf. 1810. Shell solid, capuloid, with pectinated ribs; teeth?

Type *Helcion pectinatus* (as *Patella pectinata*), Linn.,  
Gmel. Syst. Nat. 1792, p. 3710. no. 93.

2. *Helcioniscus*, Dall, n. subg. prov. Shell depressed, solid,  
with a subcentral apex; teeth arranged as in *Putinella*;  
sides of foot smooth.

Formula,  $\frac{0}{3(2-1, 1-2)3}$ .

Type *Helcioniscus rota* (Chemn.), Rve. (as *Patella*)  
Conch. Icon. pl. 17. fig. 39, a, b, c.

3. *Patina* (Leach), Gray, 1840. Shell very thin, pellucid;  
sides of foot smooth; third pair of laterals posterior,  
largest, denticulated.

Formula,  $\frac{0}{3(1-2, 2-1)3}$ .

Type *Patina pellucida*, Linn. Syst. Nat. ed. 12, 1767,  
p. 1260. no. 770 (as *Patella*).

\* \* \* \* \*

Soft parts?

1. *Metoptoma*, Phillips, 1836. Shell ovate, triangular, apex  
subcentral, posterior end truncated, or deeply, broadly  
emarginated.

Type *Metoptoma pileus*, Phil. Geol. Yorkshire, vol. ii.  
p. 223 (1836). Fossil in the Carboniferous formation  
of Great Britain. Many of the species referred to this  
genus by Billings and other palæontologists clearly do  
not belong to it.

The above sections, with the exception of *Helcion*, are well-  
defined, and will probably include the greater portion of the  
known species, though some may prove distinct from any  
yet examined. Extensive study of the soft parts has shown,  
beyond dispute, that generic distinctions founded on the shells  
alone are wholly valueless, as the latter cannot be depended  
upon for diagnostic characters; and many so-called genera and  
subgenera founded upon the shells will fall as synonyms, or  
retain their places solely as the result of accident. *Scutellina*,  
as far as known, is equivalent to *Acmaea*. *Olana*, *Scutellastra*,  
*Cellana*, &c. are founded upon characters of hardly specific  
value. The results of extended researches on this order are  
now in the press, which will include a thorough revision of  
the synonymy in full, with a definite reference of many spe-  
cies to their proper position, as determined by the sum of all  
their characters.